KENYA

Agricultural Credit Review

Adequacy of Incentives for Investment in Agriculture

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Introduction

1. Agriculture is a key sector in the Kenyan economy, employing about 70 percent of the population, earning one-half of the foreign exchange, providing food for a rapidly growing population and supplying industrial inputs. The recent stagnation of Kenyan agriculture has caused policymakers to ask questions about the adequacy of the incentives for investment in agriculture. The rate of growth in Gross Domestic Product (GDP) has slowed to 3.1 percent annually since 1972 while the rate of population growth has accelerated from about 3.5 percent to nearly 4 percent in this same period; this raises fundamental questions about the future productive capacity of Kenyan agriculture, especially when one considers that gross fixed capital formation in agriculture has declined in real terms in recent years. In order to meet the Government's targets for food production and agricultural exports in the coming years, incentives for agricultural investments, both for intensification of seasonal crop production and longer-term capital formation for agricultural development, need to be increased.

2. While policymakers have focused much attention to the issue of how financial market policies affect the performance of credit schemes, little attention has been given to the issue of how the incentives for investment may affect the performance of a credit scheme even though the latter may be equally as important in affecting the performance of a credit scheme. Profitability is central to the performance of credit schemes because profitability (rate of return to investment) affects income and thus repayment capacity of the borrower as well as expected income and willingness to borrow in the future. Since the profitability of agricultural investments affects income, this also strongly influ-

ences the amount of money rural residents have to deposit in financial institutions. In this way, profitability indirectly influences the amount borrowed and the amount deposited both of which have obvious implications for economies of scale in financial institutions. Various economic policies affect the profitability of agricultural investments. These policies include those which influence the prices received by farmers for agricultural outputs, those policies that influence the prices paid by farmers for purchased inputs, and those policies that influence farm yields. The effect of these policies on the incentives for investment in agriculture will be addressed in the next section of this report.

Agricultural Price Policy

3. Agricultural price policy in developing countries is often based on a compromise between forces that argue for domestic self-sufficiency and hence high prices for food products and those that argue for low prices to stimulate industrial processing of raw materials and to provide low cost food for urban, industrial workers. Such a compromise often tends to emphasize the level of nominal prices rather than "real" prices (that is, to adjust nominal prices for inflation), and this becomes particularly serious in an inflationary setting where prices are adjusted with a lag.[1/] What appears to be high nominal prices in an inflationary economy can quickly become low real prices that offer no incentive to increase production or investment in agriculture. In an attempt to compensate agriculture for the resulting low output prices, government credit policies typically focus on preferential low interest rates and fail to recognize that credit is fungible and cannot easily be tied to particular activ-

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[1/] In the present paper, nominal prices will be adjusted for inflation using the Consumer Price Index (CPI) deflator.

ities. Moreover, in an inflationary setting such interest rate policies discourage banks from maintaining the real volume of agricultural lending while providing substantial income transfers to a relatively few credit recipients.

4. Several government institutions play a major role in Kenyan agricultural price policy. Overall, prices of most agricultural products are determined by the government through various parastatal marketing boards or other price control policies while the prices of a few products are primarily determined by supply and demand in a competitive market. It is important to note that these institutions and policies were originally intended to benefit the farmers, yet the realized outcome many years later has generally been to penalize the farmer by adversely affecting the prices and the profitability of agricultural investments. Among the foodcrops, the government has a monopoly established by law and held by the National Cereals and Produce Board (NCPB) for maize, wheat, and rice which controls the marketing of these products and sets producer prices, retail prices and milling margins. An incentive price for edible beans is set by NCPB, but prices are largely determined by domestic supply and demand. The prices of other food crops such as fruits and vegetables are also market determined. For the industrial crops, the prices of oilseeds are market determined but the prices of sugarcane and cotton at the producer and consumer levels as well as the processing margins are controlled by the government. The Cotton Lint and Seed Marketing Board (CLSMB) has a monopoly on cotton marketing and the Kenya National Trading Corporation (KNTC) controls sugar distribution to wholesalers and retailers. Of the three export crops, the prices of two (coffee and tea) are determined by the world market price and prices of the third (pyrethrum) are set by the Government. The Pyrethrum Marketing Board has a monopoly on marketing and exports. The Kenya

Tea Development Authority (KTDA) markets all small holder tea (about 60 percent of total production), while the estates are responsible for processing and marketing their own tea. The Kenya Planters Cooperative Union (KPCU) has a monopoly on all cooperative and estate coffee processing and marketing under authority granted by the Coffee Marketing Board. Of the livestock products, beef prices are determined by supply and demand in the domestic market with retail prices set by the Government but only enforced for the lowest grades. The Kenya Meat Commission (KMC) has a monopoly on meat exports. Milk prices at the producer and consumer level as well as the processing margins are controlled by the government. The Kenya Cooperative Creameries (KCC) collects, processes, and markets about 60 percent of total production and the remainder is sold by small producers directly to consumers. The prices of poultry, pork, lamb, and goats are not controlled by the Government.

Terms of Trade

5. One aggregate indicator of the profitability of agricultural investments is the trend in the agricultural sector terms of trade which is a ratio of the index of prices received for farm products relative to the index of prices paid for purchased inputs and consumer goods in rural areas. The terms of trade declined by about 12 percent from 1972 to 1975 because prices of inputs, especially petroleum and petroleum related products, increased faster than farm output prices (Table 1). During the next two years (1975-1977), farm output prices, mainly coffee and tea, increased so rapidly that the term of trade reached their highest level of the 1970s. Since that peak, the terms of trade for agriculture have declined steadily, reaching a new low of 80 in 1982 (Table 2). This means that farmers have suffered a 20 percent decline in the purchasing power of the products they sell compared to the products they buy

since the year 1976. This decline has been caused by a doubling of the index of prices paid since 1976 due in part to the effect of exchange rate devaluations in September of 1981 and November of 1982 on the cost of purchased inputs which are generally imported or made from imported raw materials.

6. Even though the government also has price controls on purchased farm inputs, the inflation in input prices for the most part cannot be controlled because Kenya is a price taker on the world market for these imported inputs. Consequently, the input price controls can only attempt to regulate the domestic marketing and transportation charges. In contrast to the doubling of the input price index, the index of agricultural output prices increased by only 60 percent from 1976 to 1982 (Table 2). Prices of livestock and livestock products which are free of government price controls have increased the most since 1976, and prices of the export crops (coffee, tea and Pyrethrum) have increased the least due to the worldwide recession that has caused price declines in many export products. The above trends in the term of trade indicate that agricultural purchasing power has declined since 1976 and that profitability has declined, thereby reducing the incentive for investment in agriculture.

7. A second aggregate indicator of the profitability of agricultural investments is the sectoral terms of trade between agriculture and other sectors of the economy. As indicated in Table 3, the terms of trade for agriculture relative to manufacturing have declined by 6 percent since 1976 but have fluctuated from a high of 20 percent above the 1976 base to 29 percent below the 1976 base in 1979. Thus, agriculture has not only experienced declining profitability relative to manufacturing but also more variability in that profitability. If one examines the terms of trade for agriculture relative to the

rest of the domestic economy (GDP minus agriculture), a similar picture emerges. That is, the terms of trade have declined indicating a general loss of incentives to invest in agriculture compared to other sectors of the economy.

8. A more disaggregated indicator of the profitability of agricultural investments is useful to determine whether the general decline in terms of trade and profitability noted above applies throughout the agricultural sector or whether the prices and profitability of some farm products have increased while others have decreased. For the products shown in Table 4, the nominal average gross commodity prices to farmers for all 12 farm products have increased steadily throughout the 1972-1982 period. However, it is difficult to determine whether these price increases represent simply general price inflation of the Kenyan economy or real price increases caused by changes in the supply and demand for a product. For this reason, Table 5 shows the deflated average gross commodity prices to farmers (nominal prices adjusted for inflation using the consumer price index) for these same products during the 1972-1982 period. The results indicate that while the deflated prices of all 12 products increased during this period, large year-to-year fluctuations occurred for some products. The deflated prices of coffee, tea and sisal increased substantially from 1975 to 1977, reached their highest level in 1977, and then declined substantially from 1978 through 1982. Pyrethrum prices declined until 1975, then increased to a peak in 1980 and have declined since that time. Seed cotton prices increased steadily until 1978 and have since declined. Like coffee and tea prices, the deflated prices of maize also increased from 1972 to 1977 and then declined through 1982; however, unlike the large year-to-year fluctuation of coffee and tea prices, maize prices changed by relatively small amounts from one year to another. The deflated prices of sugar cane increased steadily to a peak in

1977, declined through 1981, and then increased in 1982 to about the 1977 level. The deflated prices of paddy rice increased steadily to a peak in 1976 and have declined substantially since that time. The deflated prices of the last four products (wheat, beef, bacon, and milk) all have similar price movements which are different from the other 8 products. The deflated prices to farmers of wheat, beef, bacon, and milk have increased steadily during the 1972-1982 period and are currently at the highest level of the period.

9. Several interesting points need to be made about the behavior of the deflated prices of these 12 products. First, the export products of coffee and tea whose prices depend to a large extent on world markets, are the products with the greatest price fluctuations and therefore the highest risk and variability of return on investment. Profitability is not only higher than that for the other commodities but also much more variable. Even though pyrethrum is also an export products, prices and profitability have been more stable and probably lower than those for coffee and tea, because of the Government's greater efforts to control the farm price. Second, the food crops of maize, wheat and rice all have NCPB controlled prices which exhibit more price stability than the export crops. Deflated maize prices have increased less than the prices of any other product and may reflect the Government's interest in holding down the price of one of the staples of the Kenyan diet. Deflated wheat prices have increased more than those for maize due to the Government's interest in promoting domestic production to substitute for wheat imports. Third, deflated prices of the livestock products, especially beef and bacon, reached their highest levels in 1982. Since the prices of these products are free of government controls, the increasing prices and profitability of beef and bacon reflect changing domestic demand and supply conditions. Milk prices

which are subject to government price controls have increased but have not kept pace with the price increases of beef and bacon which are not subject to government price controls. Fourth, the deflated prices of those products with market determined prices such as coffee, tea, beef, and bacon have enjoyed more favorable price movements and greater profitability than the deflated prices of those products subject to government price controls such as maize and wheat. Thus, government price controls in conjunction with the parastatal marketing boards have adversely affected the prices and profitability of some farm products, reducing the incentives to increase production and investment.

Farm Yields

10. In addition to the influence of the prices of outputs and the prices of inputs on profitability, one must consider policies that influence farm yield. While it is beyond the scope of this paper to investigate government policy toward research to develop improved crop varieties and livestock breeds, an examination of maize and wheat yields indicates an increasing trend from 1970 to 1982 (Table 6). Wheat yields have increased faster than maize yields during this period but the yields of both vary considerably from year to year because of weather uncertainty, changing levels of input use, and area planted. When compared to other countries, the average maize yield in Kenya of 1.89 metric tons per hectare is low; less than 30 percent of the average U.S. yield and about 50 percent of the maize yield in developing countries such as Argentina and Thailand. Wheat which is produced almost entirely on larger, commercial farms has yields that compare more favorably (about 60 percent of U.S. yield) to those in the U.S. Maize yields in Kenya are only about 25 percent higher than the wheat yields; this is significantly lower than in the U.S. where maize yields are approximately three times the wheat yield which indicates that more

needs to be done to improve maize yields in Kenya. These data indicate that increasing yields have had a favorable impact on maize and wheat profitability although it is clear that much more needs to be done to improve the overall level of yields and to reduce the variability of yields both of which would contribute to reduced risk and higher profitability.

Estimated Farm Costs and Returns

11. Despite the increase in average maize and wheat yields noted in the 1970 to 1982 period, estimates of the costs and returns indicate that production of either crop is unprofitable for the average producer. Based on Ministry of Agriculture (MOA) estimated costs and returns from wheat production on large commercial farms which produce nearly all the wheat, wheat production is only profitable at yields of 30 or more bags of 90 kg. per hectare (Table 7). At this yield level wheat production has a positive gross margin that pays a small return to the land and management factors of production after deducting all the variable costs of production plus an interest charge. However, only the good farmer can achieve that yield level in wheat production. For the large majority of farmers who obtain average yields (between 15 and 22 bags per hectare) wheat production was not a profitable enterprise in 1982. The MOA estimated costs and returns for large commercial maize production indicate that maize was just as unprofitable as wheat for the average farmer. The maize farmer must obtain yields of 60 or more bags of 90 kg. per hectare to earn a positive gross margin after deducting all the variable costs of production plus an interest charge. This yield level is nearly three times the average maize yield of 22 bags of 90 kg. per hectare in 1982. One may argue that production costs on large commercial maize farms are not the appropriate measure since most maize is produced on small commercial farms and even subsistence farms

that rely primarily on family labor in the production process. Even on small commercial farms the maize yield must exceed 33 bags of 90 kg. per hectare, which is 50 percent above the 1982 average maize yield to earn a positive gross margin after deducting all the variable costs of production plus an interest charge. The above data indicate that maize and wheat production is unprofitable for farmers who only obtain average yields; higher yields and/or prices are needed to improve the incentives for producers to invest more and produce more in these enterprises.

12. Gross margins for the products with market determined prices such as the export crops of coffee and tea or local food products such as tomatoes and bacon are much higher than those for the price controlled products such as maize, wheat and dairy (Table 8). Tea, tomatoes and bacon all have high positive gross margins while coffee has a lower gross margin and dairy (also a price controlled product) has a negative gross margin. Because of these higher gross margins, the incentives to invest and expand production appear to be much stronger for the export crops or the domestic products which are not subject to government price controls, than for maize or wheat. Although the returns are much higher for some of these products, farmers may still prefer maize production because the maize is needed for home consumption and because the price and yield variability is much less than that for tomatoes or bacon.

13. When analyzing estimated costs and returns, it is important to bear in mind a number of problems associated with farm budget studies wherever they have been conducted. The Ministry of Agriculture Farm Management Branch develops estimates of the farm cost/price situation for a wide range of farm products to present a comprehensive picture of the profitability of agricul-

ture. This cost of production information serves a variety of uses in agricultural planning, international trade, pricing policy, agricultural lending, and agricultural extension. The costs and returns are estimated from the results of about 200 record keeping farms, special farm surveys, research data, and MOA extension personnel. The Agricultural Finance Corporation (AFC) uses the MOA production costs studies together with its own information to develop production cost estimates for use as a guideline by loan officers in loan preparation and appraisal. These production cost studies have methodological problems as well as data problems. Since each farm has a unique cost structure, the methodological problems include deciding whether to select the marginal, average or above average farm, the region of the country to represent, the level of technology to use, the level of management to use, the production costs to include, and the rate at which to depreciate the productive assets. The main data problems are those of reliability of the input and output prices used, the technical coefficients of the production process and on-farm consumption. The MOA and AFC production cost estimates contain many of these deficiencies. The cost estimates are biased toward the better farms, the higher potential areas of the country, and the higher levels of technology and management. The present estimates do not accurately represent the costs and returns on the large number of small family farms in Kenyan agriculture. The production cost estimates may also fail to accurately represent input and output prices because the official government controlled prices are used rather than the prices actually paid by farmers for inputs and prices actually received by farmers for outputs. This use of official prices leads to an underestimate of the price of inputs and an overestimate of the price received for outputs.

14. Because of major problems in the marketing and input supply sectors that adversely affect the farm-gate prices of inputs and outputs, the incentives to invest in agriculture are greatly reduced. Due to the frequent shortages of critical inputs, high distribution costs and transportation costs of farmers, actual farm-gate prices of inputs are often substantially higher than official prices at an input supply store. Much of the higher cost is caused by the small quantities that most family farmers buy and the long travel distances from farm to market. In addition, MOA research has shown that late arrival of critical inputs such as maize seed and fertilizer by 3 weeks after the start of the rains will cause a 50 percent decrease in the additional maize yield from the fertilizer application. Such a decrease in the expected return from fertilizer may cause a knowledgeable farmer to stop investing in fertilizer due to the input supply problems. Similarly, the marketing problems greatly increase the cost and risk of agricultural production. Prices received for the crop often fall substantially below the official prices due to high transport costs and late payments for the delivered crop. Payment delays of as much as six months after farmer delivery of the crop to the NCPB are a critical problem for maize and wheat producers as well as for producers of other agricultural products delivered to any of the parastatal or monopoly marketing organizations. Although these represent only a few of the many marketing and input supply problems, they serve to illustrate not only the magnitude of the problem but also the inter-relationship of these factors with agricultural credit and the implications for the effective use of credit. The problems of the New Seasonal Credit Scheme (NSCS), to be discussed later in this report, cannot be solved without also solving the marketing and input supply problems.

Conclusions and Recommendations

15. The inadequacy of the incentives for investment in Kenyan agriculture as measured by the declining terms of trade raise fundamental issues of whether the prospects for future growth in production and productivity will keep pace with a rapidly growing domestic and export demand for food products. Because agricultural output prices have not increased as fast as purchased input prices since 1976, the purchasing power and profitability have declined by about 20 percent.

16. During the 1972-1982 period, the nominal and deflated prices of export crops and livestock products free of price controls increased faster than the prices of domestic food crops subject to price controls. The profitability and incentives to invest appear much greater in the export crops and domestic products free of government price controls than for price controlled products.

17. The farm production cost estimates of MOA and AFC demonstrate that maize and wheat production is not profitable for the large majority of farmers who obtain average yields. Furthermore, the yield levels that do show a profit can only be achieved by a small percentage of the maize and wheat farmers. Profitability and the incentives to invest are much higher among the export crops of coffee and tea and food products such as bacon and tomatoes where prices are free of government controls than for maize and wheat.

18. The problems of the parastatal marketing boards and input supply further reduce the incentives for investment in agriculture because their many inefficiencies increase the cost and risk of using purchased inputs as well as reduce the return on the sale of the output.

References

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Kenya
Agricultural Credit Review
Price and Terms of Trade Indices for Agriculture, 1973-1977

Year	Index of Prices Received	Index of Prices Paid	Agricultural Sector Terms of Trade
		1972 = 100	
1973	111	115	96
1974	129	142	91
1975	145	165	88
1976	216	178	121
1977	310	205	152

Source: Central Bureau of Statistics, Economic Survey, 1978

KENYA

AGRICULTURAL CREDIT REVIEW

PRICE AND TERMS OF TRADE INDICES FOR AGRICULTURE, 1977-1982

1976=100

	1977	1978	1979	1980	1981	1982
Prices Received-						
Total Crops	119.5	119.1	116.4	122.3	129.7	138.0
Domestic	112.5	116.1	115.9	130.7	141.3	147.8
Export	153.3	120.0	116.8	117.4	112.3	134.6
Livestock and Products	123.4	129.3	135.6	140.6	151.2	166.7
Weighted Average of Above	120.1	121.0	120.0	126.2	134.4	145.0
General index of agricultural output prices.	-	119.2	123.1	133.1	145.8	159.5
Prices Paid-						
Purchased Inputs	114.4	119.3	124.5	137.9	153.3	182.1
Index of Purchased Consumer Goods- Rural Areas	107.8	117.0	130.1	146.1	169.9	205.5
INDEX OF PRICES PAID	109.4	117.6	128.7	144.1	165.8	199.7
Agricultural Sector Terms of Trade	109.8	101.4	95.6	92.4	87.9	80.0

Source: Central Bureau of Statistics, Economic Survey, 1983.

Table 2

Kenya
Agricultural Credit Review
Sectoral Terms of Trade, 1976-81
(1976 = 100)

	1976	1977	1978	1979	1980	1981
GDP Deflators[1/]						
(1) Agriculture	100	130	119	123	132	143
(2) Manufacturing	100	108	117	174	140	153
(3) Building and Construction	100	109	121	141	161	171
(4) Trade and Hotels	100	115	121	129	143	164
(5) Transport and Communication	100	107	124	131	137	151
(a) GDP, minus (1)	100	111	121	129	143	159
(b) GDP, minus (2)	100	120	120	119	139	154
(c) GDP, minus (3)	100	119	120	126	138	153
(d) GDP, minus (4)	100	119	120	127	138	152
(e) GDP, minus (5)	100	119	120	127	138	154
Terms of Trade						
Agriculture						
(1) ÷ (2)	100	120	102	71	94	94
(1) ÷ (a)	100	108	98	95	92	90
Manufacturing						
(2) ÷ (1)	100	83	98	142	106	107
(2) ÷ (b)	100	90	98	146	101	99
Building and Construction						
(3) ÷ (c)	100	92	101	112	117	112
Trade and Hotels						
(4) ÷ (d)	100	97	101	102	104	108
(Transport and Communication						
(5) ÷ (e)	100	90	103	103	99	98

[1/] Monetary economy only.

Source: Economic Survey, 1981-82

Kenya
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Nominal Average Gross Commodity Prices to Farmers
1972-1982
(K.SH. Per Stated Unit)

Item	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Coffee (100 Kg.)	779	921	1008	1069	2524	3975	2818	2815	2634	2258	2780
Tea (100 Kg.)	601	593	721	808	1057	2149	1583	1357	1591	1774	1941
Sisal (100 Kg.)	90	191	443	323	234	398	272	361	414	412	503
Pyrethrum Extract (100 Kg.)	396	415	430	447	492	559	720	1006	1200	1150	1150
Seed Cotton (100 Kg.)	115	122	155	192	209	288	315	328	331	341	352
Maize (100 Kg.)	39	39	46	70	77	89	89	77	95	100	107
Sugar Cane (1 Ton)	50	52	62	89	105	127	133	133	133	145	170
Rice Paddy (100 Kg.)	51	50	59	104	137	136	145	151	151	150	150
Wheat (100 Kg.)	51	57	80	105	120	133	133	144	164	167	188
Beef (Third Grade) (100 Kg.)	302	346	413	474	479	519	676	689	795	960	1100
Bacon (100 Kg.)	418	426	567	636	655	684	764	778	859	975	1373
Milk (100 Liters)	77	77	77	85	105	132	132	132	146	186	215

Source: Central Bureau of Statistics, Economic Surveys

Table 4

Kenya
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Average Yield of Maize and Wheat 1970-1982

Date	Average Yield in Metric Tons per Hectare		Percent Change in Yield	
	Maize	Wheat	Maize	Wheat
1970	1.60	1.43	-	-
1971	2.08	1.48	30.0	3.4
1972	1.76	1.54	-15.4	4.0
1973	1.66	1.59	- 5.7	3.2
1974	1.85	1.60	11.4	0.6
1975	2.06	1.49	11.4	- 6.9
1976	2.05	1.52	- 0.5	2.0
1977	2.08	1.33	1.5	-12.5
1978	1.99	1.37	- 4.4	3.0
1979	1.68	1.18	-15.6	-13.9
1980	1.68	1.85	0.0	56.8
1981	2.12	1.98	26.2	7.0
1982	1.97	N.A.	- 7.1	N.A.
Average	1.89	1.53	2.6	4.2

Source: Ministry of Agriculture

Kenya
Agricultural Credit Review
Estimated Gross Margins From
Wheat and Corn on Large Commercial Farms in 1982

Yield Level Bags of 90 kg/ha	WHEAT			MAIZE		
	15	22	30	30	45	60
	---- Kshs ----					
Gross Output	2,925	4,290	5,850	4,286	6,428	8,571
Total Variable Costs	3,858	4,169	4,528	4,857	5,987	7,226
Gross Margin	- 933	121	1,322	- 571	441	1,345
Interest @ 12%	441	462	486	468	566	700
Gross Margin Including Interest	-1,374	- 341	836	-1,039	- 125	645

a/ See Appendix Tables 1 and 2 for a detailed explanation of these cost and return estimates.

Source: Ministry of Agriculture, Costs of Inputs, Prices of Agricultural Produce and Costs of Production

Kenya
Agricultural Credit Review
Estimated Gross Margins From Coffee, Tomatoes and Baconer in 1982[a/]

	Coffee[b/]	Tea[c/]	Tomatoes	Baconer[d/]	Dairy[e/]
	- - - - Kshs - - - -				
Gross Output/Ha	20,000	66,300	40,000	22,280	6,090
Total Variable Costs	16,145	20,239	6,680	14,358	6,072
Gross Margin	3,855	46,061	33,320	7,922	718
Interest @ 12%	1,937	2,428	802	1,722	728
Gross Margin Including interest	1,918	43,633	32,518	6,200	- 710

[a/] See Appendix Tables 3 and 4 for a detailed explanation of these cost and return estimates.

[b/] Average of the first four years

[c/] After the first year

[d/] Per sow

[e/] Per dairy cow

Source: Agricultural Finance Corporation, Farm Management Guideline